

# Moist-soil Management: Back to the Basics



**“Silver bullets don’t exist in the marsh.”  
(Anonymous)**

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California Department of Fish and Game

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# Moist-soil Management

FUN



Sara Evans

NOT FUN



July in Central Valley

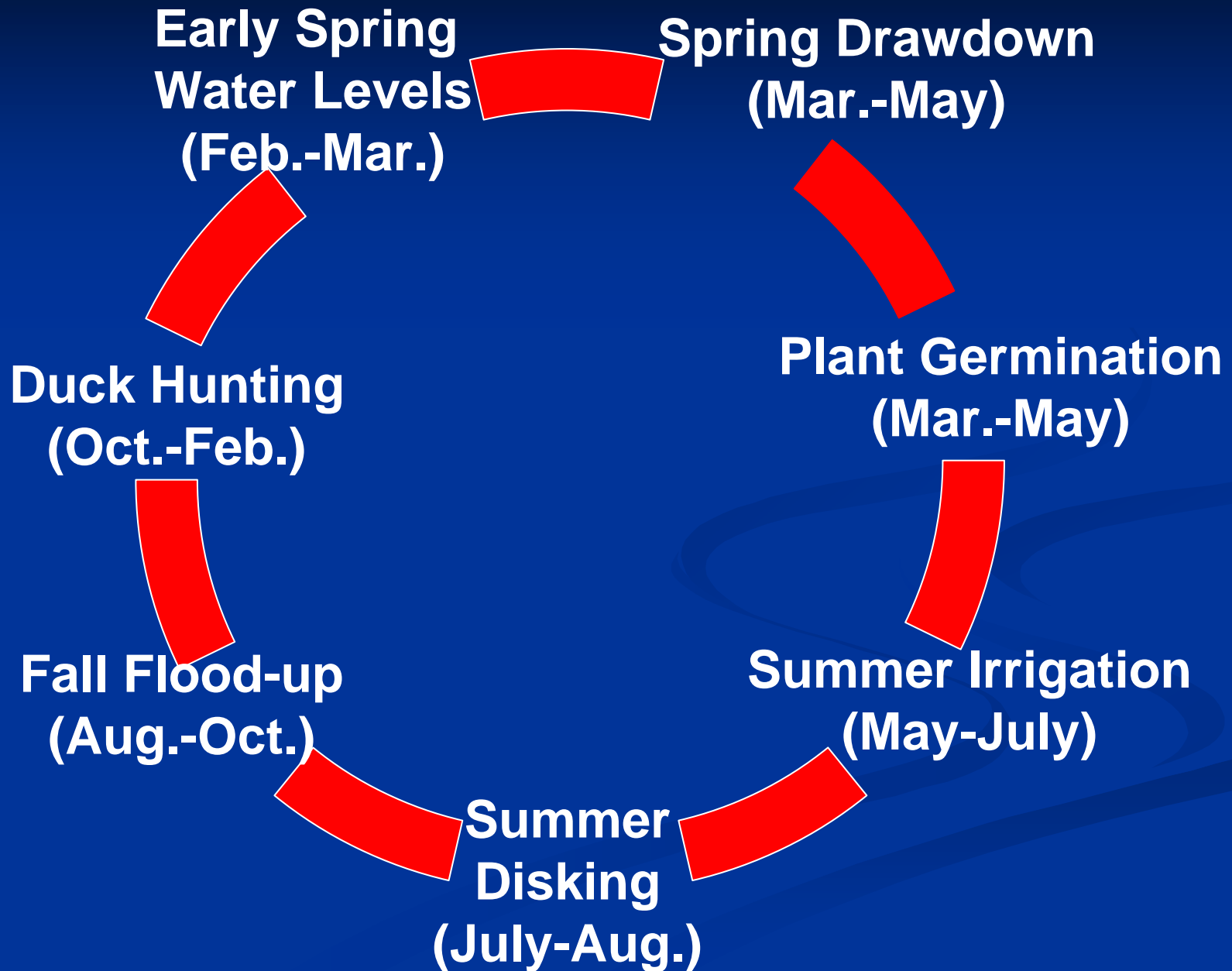
# Basics

- Plant Identification
  - Good vs. Bad
- Observation
  - Science AND Art
- Management
  - Drawdown
  - Irrigation
  - Disking
  - Fall flooding
- Record-keeping
  - What? When? Where?

# Moist-soil Management

- Hydrology = Water
  - Drawdown
  - Irrigation
- Soil = Dirt
  - Disking
- Seed banks = Seeds
  - Annual plants
  - Perennial plants

# Annual Cycle





# Hydrology



# Spring Drawdown

- Mud flat
  - When does it occur at your club??
    - February – Weeds
    - March – Smartweed, swamp timothy, watergrass
    - April – Swamp timothy, watergrass, sprangletop
    - May – Watergrass
    - June – Watergrass
  - How long does it take to drain ~75% of the pond?
    - Fast
    - Slow
- Shorebirds – timing of peak migration in your area





# Moist-soil Plants

- Annuals vs. Perennials
- Plant ID



# Hardstem Bulrush (*Scirpus acutus*) aka tule, roundstem



# Cattail (*Typha angustifolia*) aka flag-leaf tule, flat-leaf tule, narrow-leaf tule





# Cocklebur (*Xanthium strumarium*) aka cockleburl, velcro weed, porcupine eggs



Waterfowl Benefits???



# Cocklebur





# White Sweet Clover

aka jackass clover, brown-stem



Waterfowl Benefits???



# Beggarstick (*Bidens* spp.)



Waterfowl Benefits

# Aster

## aka marsh aster, brown stem



Waterfowl Benefits



# Smartweed (*Polygonum lapathifolium*) aka redweed, smartgrass

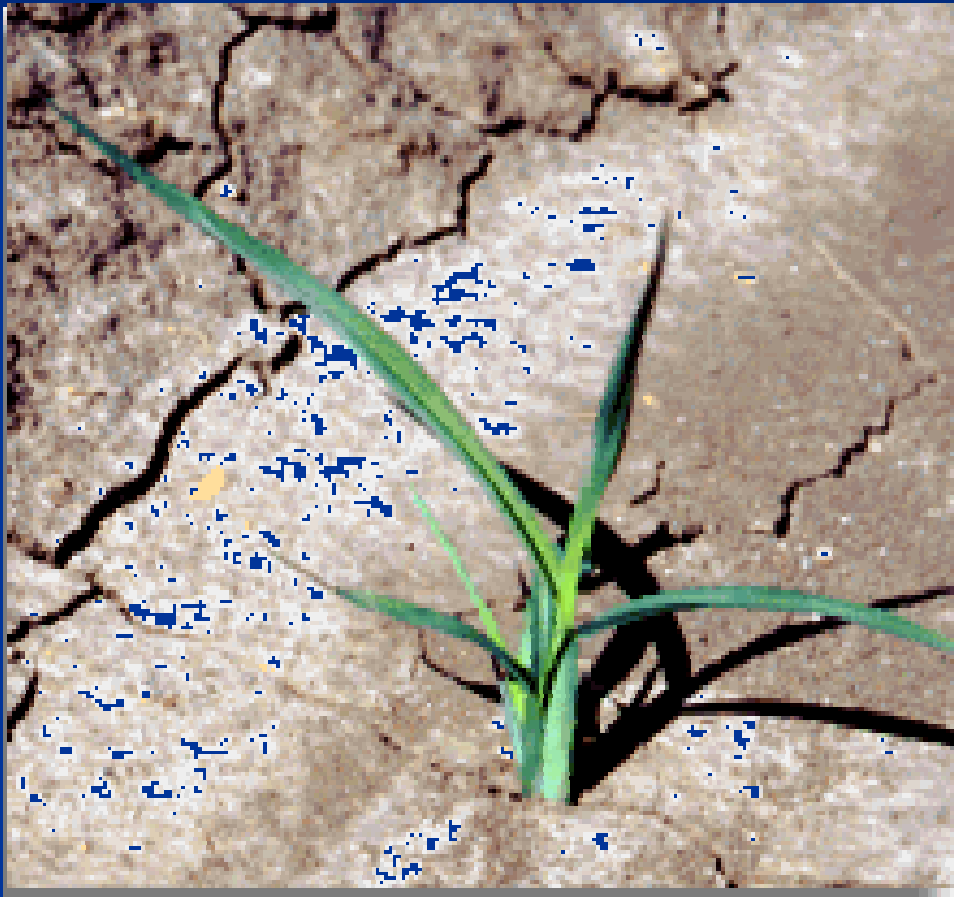


Waterfowl Benefits: Seeds and invertebrates



# Watergrass (*Echinochloa crusgalli*)

aka waterweed, millet, barnyard grass, jungle rice



Waterfowl Benefits: Lots of seed!!!



# Joint Grass (*Paspalum distichum*) aka knot grass, giant Bermuda grass



Benefits: Cattle forage

Drawbacks: Mosquito heaven



# Bermuda Grass (*Cynodon dactylon*)



Waterfowl Benefits??



# Swamp Timothy (*Crypsis schoenoides*) aka pond timothy





# Pricklegrass (*Crypsis niliaca*) aka African pricklegrass



Waterfowl Benefits

# Sprangletop (*Leptochloa fascicularis*) aka spangletop, sprinkletop, spranglegrass



Sprangletop

Watergrass



# Alkali Bulrush (*Scirpus robustus*) aka nutgrass, tuberous bulrush, chufa



Waterfowl Benefits: some seed value, starchy stem for goose grazing

# Water Primrose (*Ludwigia hexapetala*)



Waterfowl Benefits: None



# Other Moist-soil Plants

- Toothcup (*Ammania coccinea*) – aka redberry
- Spike rush (*Eleocharis* spp.) – aka spike rush
- Brass buttons (*Cotula corinopifolia*)
- Fat hen (*Atriplex* spp.) – annual atriplex

# Irrigation

- Important Points:

- 1) Plant Stress = Seed Production
- 2) No Stress = Vegetative Growth

- How many??

- 1x
- 2x
- 3x

- How long??

- 5 days
- 7 days
- 14 days
- 21 days

- How far apart??

- 4-6 weeks
- 6-8 weeks



# Soil Manipulation (i.e, DISKING)



- 1) Annual disking  $\leq 20\%$  of pond
- 2) After irrigation = best weed control (Gray et al. 1997)
- 3) Disking = greater seed production the following year (Naylor 2002)
- 4) Smooth seed bed helps good stuff grow

# Seed Bank

“If you disk it...They will grow”



- Seeds are present in soil
- Watergrass planting = \$\$\$
  - Sometimes necessary, many times not
  - Baiting issues



# Herbicide Application

- Glyphosate – grasses
- 2,4-D – broadleaf weeds
- Triclopyr – water primrose
- ALWAYS follow label directions!!
  - Licensed applicator required?
  - Wind = Drift = Problems



# Fire

What should always be present? —————→ 1) Proper Supervision (USFWS Fire Crew)



2) Effective Fire Breaks

3) Proper Fire-fighting Equipment



# Wetland Food Plots = Gimmick

- Are they allowed?
  - USFWS Conservation Easement - NO
  - WRP Easement – NO
  - DFG Permanent Wetland Easement – NO
- What do food plots provide?
  - Food?
  - Cover?
- Do waterfowl need them?
  - Are “hot foods” a limiting factor in the Central Valley?
- How much do they cost?
  - Disking, seed drilling, fertilizing, irrigations, herbicide.....
- Are you baiting?

# Moist-Soil Habitat = Hard Work

- What does moist-soil habitat provide?
  - Food?
  - Cover?
- Do waterfowl need them?
  - Are wetlands a limiting factor in the Central Valley?
- How much does moist-soil habitat cost?
  - Drawdown, disking, and irrigation
- Is it allowed?
  - Yes
- Are you baiting?



# Carrying Capacity of Waterfowl Habitats

Habitat	Food available (lbs/ac)	True metabolizable energy (TME;kcal/g)	DEDs/ac
Moist-soil Habitat (Naylor 2002)	533	2.5	1,868
Semi-permanent Wetland (Naylor 2002)	52	N/A	N/A
<b>Harvested Crops</b>			
Rice (MAV)	71	3.00	138
Rice (California)	292	3.00	138
Corn (California)	463	3.67	505
Milo (MAV)	134	3.49	480

\*Adapted from several sources

# What Do We Know?

- Moist-soil management can be improved
  - Naylor 2002
  - Kross et al. 2007
- Cost-effective way to produce lots of food
  - Olsen and Eadie 2007



# 2008 Management Survey

- UC-Davis and CDFG
  - Mike Brown and Dr. John Eadie
  - Ed Penny
- Questionnaire sent to Presley Program-enrolled landowners in Sac Valley
- Attempt to quantify irrigation effects on landscape scale (Sac Valley)

# CWHP Staff

- Dean Kwasny, Senior Wildlife Biologist
- Ed Penny, Associate Wildlife Biologist
- Marc Kenyon, Contract Biologist (Landowner Incentive Program)
- John Hunt – CDFG/NRCS Biologist
- Alison Pierce – CDFG/NRCS/FWS/IWJV Biologist





# Moist-soil Management = Results



2 days/2 hunters/moist-soil habitat (2007)

# Thanks!

